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was published in 1861, numbering nearly 1000 pages. He was also the author of "Microscopic Illustrations," "Micrographia" and the "Microscopic Cabinet," but he will be chiefly held in remembrance in this country as the author of the useful and laborious work first mentioned. He was born in London in 1804.

— Casimir-Joseph Davaine, who first suggested, says the *Journal de Micrographie*, the germ disease theory, and who discovered the bacterium of carbuncle, died at Garches, near Paris, Oct. 15, 1882.

— Dr. Thwaites, for many years director of the Royal Botanic Gardens, Peradeniya, Ceylon, died, Sept. 11, at Kandy.

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PROCEEDINGS OF SCIENTIFIC SOCIETIES.

Biological Society of Washington, Dec. 8.—Communications were presented by Professor Theo. Gill on the Stromateidæ; Professor D. W. Prentiss on changes produced in the bird fauna of the District of Columbia by modifications of its topography.

Dec. 22.—Communications were made by Dr. Elliott Coues on zoölogical nomenclature applied to histology; Dr. M. G. Ellzey on hybrid sterility; Dr. T. H. Bean on the occurrence of the alewife in Lake Ontario; and by Professor C. V. Riley on the lignified snake of Brazil, with exhibition of specimen.

New York Academy of Sciences, Dec. 18.—A paper was read on the language, beliefs and superstitions of the Iroquois Indians (illustrated with early and remarkable manuscripts dictionaries, etc., etc.), by Mrs. Erminnie A. Smith.

Boston Society of Natural History, Dec. 20.—Miss Alice A. Fletcher gave an account of the sun dance of the Sioux Indians; and Dr. Charles S. Minot spoke on the rate of growth in man.

Jan. 3, 1883.—Professor C. O. Whitman described a rare form of the blastoderm of the chick, and discussed its bearing on the question of the formation of the vertebrate embryo; Dr. S. Kneeland presented some notes on the natural history of the Philippines, etc., showing specimens.

American Geographical Society, Dec. 20. — Andrew D. White, LL.D., delivered a lecture on the New Germany.

Jan. 9, 1883.—Daniel C. Gilman, LL.D., delivered the annual address, entitled the North American continent, four centuries of discovery.

Appalachian Mountain Club, Dec. 15.—Mr. W. O. Crosby read a paper on the mountains of Eastern Cuba.

CHICAGO BIOLOGICAL SOCIETY, Oct. 2, 1882.—Dr. H. Valin read a paper on experiments in artificial production of organic forms.[1] In January of the present year the French chemists, D. Monnier and C. Vogt, presented, through M. Robin, to the French Academy of Sciences, the results of some experiments showing that the forms peculiar to plants and animals also appear under certain circumstances in purely inorganic things (*Comptes Rendus*, Jan. 2, 1882). This is their language: "Objects endowed with well-defined shapes, exhibiting all the characteristics of the forms met in organic bodies, such as simple cells, cells with porous tubes attached, tubes with walls or with partitions, filled with hetereogeneous and granular contents, etc., can be artificially produced in an appropriate liquid by the reactions of two salts, forming, by double decomposition, either two, or one insoluble salt. One of the salts must be dissolved in the liquid, while the other must be solid in form. * * * * The forms met in organic bodies (cells and tubes) being produced just as well in a liquid with an organic or semi-organic (sucrate of calcium) origin as in a liquid of a purely inorganic origin (silicate of sodium), there cannot be henceforth any characteristic forms by which to distinguish inorganic bodies on the one hand, from organic bodies on the other. * * * * It is likely that the inorganic substances met in organic protoplasm have some function in determining the forms which living organisms assume."

Dr. Valin had repeated these experiments a number of times in the last six months, and made the following observations: In a flask full of soluble glass, were placed fragments of sulphate of iron, ten grains in weight, which immediately began to assume a colloid condition on the outside, and shot tubular prolongations, colloidal and cellular, which grew at the rate of half an inch in twenty-four hours. Some attained to two inches in length, and were about $\frac{1}{12}$ of an inch in diameter. All these prolongations shot a number of slender filaments from various points of their surface, and these attained a length of a few inches in a few hours. After a few days or weeks all these organisms assume a crystalline condition and become empty inside. Some of them rise to the surface of the liquid. They are insoluble in water, they remain intact when exposed to air, and when introduced in a newly prepared flask at the same time with fresh fragments, they hasten the metamorphosis of these. The addition of water to the soluble glass renders the experiments more easy and saves time.

Watched under the microscope, the fragments of sulphate of iron are seen to swell all around. An unctuous, colloid mass is formed, which consists of fine granules perfectly similar to animal tissues. This mass stretches into prolongations, and fluid contents are seen to flow inside these. When the surface of some prolongations was opened into, a semi-solid substance grew out of the opening into new prolongations. One of these mineral organisms, when placed on a fresh fragment, shot some new prolongations, as if real grafting had taken place.

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[1] See AMERICAN NATURALIST, 1882, p. 509, "On the Nature of Life."

Organisms of sulphate of copper, sulphate of zinc, alum, phosphate of iron, etc., were similarly obtained, each possessing a form peculiar to itself and distinct from the others. Analogous forms grew in saccharated lime-water. Cellular bodies of the same minerals formed in solutions of alkaline carbonates.

These experiments relate to the almost unknown department of chemistry which treats of colloids, and as crystalline solutions grow into symmetrical crystals, so a colloid substance in process of formation assumes a typical form, and must be the start of all forms in animals and plants. These so-called mineral organisms, viewed with the naked eye, under the microscope, or chemically tested, come as near to the lower animals and plants, as these are from one another, and form a new field of investigation for the biologist. We can no longer say that only living things grow, unless we reckon these as living.

Among the conclusions of Dr. Valin's paper were these: "That the vitality or growth of these mineral organisms consists in the passage of a crystal into a colloid, and is thus correlated, but not identical, with the kinetic process known as crystallization. That the molecule of the bodies consists of many elements, and that acid and alkaline polarities are always concerned in their growth, for only acid minerals in alkaline solutions gave rise to them. That we have a right to suppose that living protoplasm is nothing but a highly complex mineral organism in favorable media (water and air)."

This would tend to confirm the growing belief among biologists, that life is nothing but the energy manifested by the forty and odd (Reinke) proximate principles which constitute protoplasm, when they pass from the crystalline or soluble into the colloid state in the proper media.

In the brief discussion which followed, Dr. Clevenger asked the writer whether he believed that the growth of these minerals might not be dependent on the action of some micro-organisms.

Dr. Valin answered that some micrococci had been seen in the solutions used, and that a large fungus at one time covered the surface of the water in one flask with its mycelium, visible to the naked eye. But as the minerals referred to grow instantaneously in any kind of water, and as this water remains transparent, it excluded the possibility of any bacterial action.

The question was the more pertinent, however, as Alphonse Wurtz, the great chemist, made a communication to the Académie des Sciences, not long ago, in which he described a vibrion which is always found in certain germinating seeds, as that of Indian corn. It seems that this micro-organism is indispensable to the process of germination and that its role consists in eating into the outer coat of the seed, which thus becomes permeable to water.